

IN THE CLAIMS

1. A thermoplastic resin composition for laser welding comprising:

5 1) thermoplastic resin; and

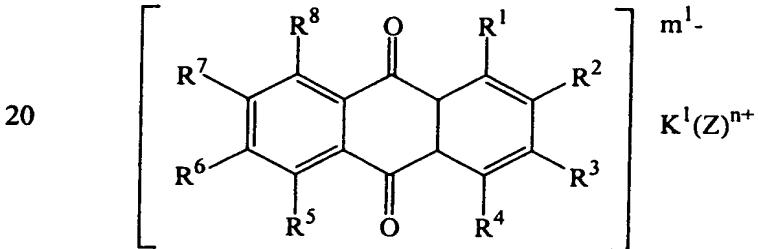
2) laser-transmitting black colorant comprising amine salt of anthraquinone dye.

2. A thermoplastic resin composition for laser welding comprising:

10 1) thermoplastic resin; and,

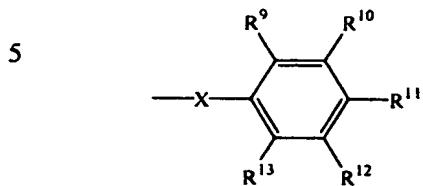
2) laser-transmitting black colorant comprising amine salt of anthraquinone dyes of formula [I] or formula [II],

wherein Formula [I] is:

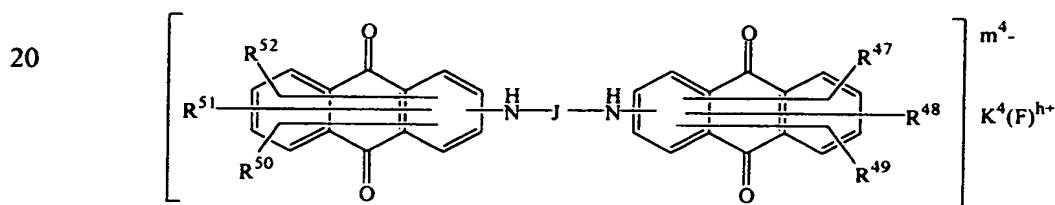


wherein R^1 to R^8 , which may be the same or different, are independently selected from the group consisting of H, alkyl, aryl, alkenyl, alkoxy, amino, hydroxy, halogen atom, acyl, acyloxy, acylamide, acyl-N-alkylamide, carboxyl, alkoxycarbonyl, cyclohexylamide, sulfonyl, formula [I-a], or -Y-W, and at least one of R^1 to R^8 is of formula [I-a]; wherein Y is S, O, or NH; wherein W is selected from unsubstituted or substituted alkyl group, alkenyl group, and unsubstituted or substituted aryl group; wherein $(\text{Z})^{n+}$ represents ammonium ion or a cation derived from an organic amine compounds or a basic dye; wherein n is 1 or 2, m^1 is an integer from 1 to 4 and K^1 is the ratio of m^1 / n ;

and wherein formula [I-a] is:



10 wherein X is O or NH, and R⁹ to R¹³, which may be the same or different, are independently selected from the group consisting of H, alkyl, aryl, alkenyl, alkoxy, amino, N-alkylamide, N-arylamide, hydroxy, halogen atom, acyl, acyloxy, acylamide, acyl-N-alkylamide, carboxyl, alcoxycarbonyl, or sulfonyl; wherein at least one of R¹ to R⁸ and R⁹ to R¹³ is sulfonyl group; and wherein
15 formula [II] is:



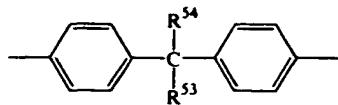
wherein R⁴⁷ to R⁵², which may be the same or different, are independently selected
30 from the group consisting of H, alkyl, aryl, alkenyl, alkoxy, amino, N-alkylamide, N-arylamide, hydroxy, halogen atom, acyl, acyloxy, acylamide, acyl-N-alkylamide, carboxyl, alcoxycarbonyl, or sulfonyl; and at least one of R⁴⁷ to R⁵² is of sulfonyl; and

Formula J in formula [II] is selected from formula [II-a] or formula [II-b] and
35 binds two anthraquinone,

Wherein formula [II-a] is:



50 and formula [II-b] is:

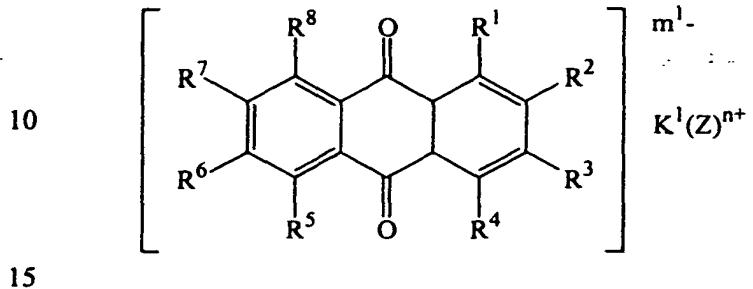


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wherein R⁵³ to R⁵⁴, which may be the same or different, are independently selected from the group consisting of alkyl(having 1 to 8 carbon atoms) or hydrogen ; and wherein (F)^{h+} represents ammonium ion or a cation derived from an organic amino compounds or a basic dye wherein h is 1 or 2, m⁴ is an integer from 1 to 4 and K⁴ is the ratio of m⁴/ h.

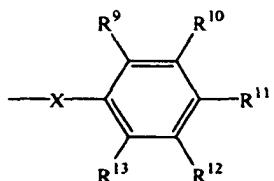
- 15 3. The composition of claim 1 further comprising a second dye mixed with said amine salt of said anthraquinone dye to produce a laser-transmitting black dye.
- 20 4. The composition of claim 2 further comprising a second dye mixed with said amine salt of a said anthraquinone dye to produce a laser-transmitting black dye.
- 25 5. The composition of Claim 4, wherein said second dye is selected from the group consisting of perinone dyes, monoazo complex dyes, anthrapyridone dyes and anthraquinone dyes.
- 30 6. The composition of Claim 2 further comprising (i) a red dye to be mixed with said amine salt of said anthraquinone dye to produce a laser-transmitting black dye, said red dye selected from the group consisting of perinone dyes, monoazo complex dyes, and anthrapyridone dyes; and (ii) an additional yellow dye to be added to said mixture selected from the group consisting of monoazo complex dyes and anthraquinone dyes.
- 35 7. The composition of any one of claims 1-6 in which said thermoplastic resin is polyamide or polyester.
8. The composition of Claim 7, further comprising reinforcing agent.
9. A laser-transparent article formed from the composition of any one of Claims 1-6.
10. An article formed by laser welding an opaque article with the laser-transparent article of Claim 9.
11. A laser-transmitting black colorant suitable for being mixed with a thermoplastic resin comprising at least amine salt of anthraquinone dyes.
12. A laser-transmitting black colorant suitable for being mixed with a thermoplastic resin comprising amine salt of anthraquinone dyes of formula [I] or
- 40 formula [II],

wherein Formula [I] is:

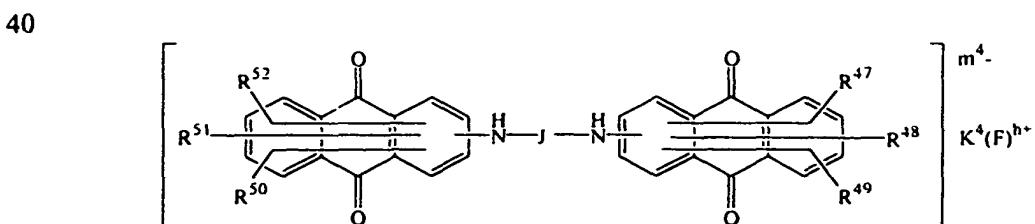


wherein R^1 to R^8 , which may be the same or different, are independently selected from the group consisting of H, alkyl, aryl, alkenyl, alkoxy, amino, hydroxy, halogen atom, acyl, acyloxy, acylamide, acyl-N-alkylamide, carboxyl, alkoxy carbonyl, cyclohexylamide, sulfonyl, formula [I-a], or -Y-W, and at least one of R^1 to R^8 is of formula [I-a]; wherein Y is S, O, or NH; wherein W is selected from unsubstituted or substituted alkyl group, alkenyl group, and unsubstituted or substituted aryl group; wherein $(\text{Z})^{n+}$ represents ammonium ion or a cation derived from an organic amine compounds or a basic dye; wherein n is 1 or 2, m^1 is an integer from 1 to 4 and K^1 is the ratio of m^1 / n ;

20 and wherein formula [I-a] is:



wherein X is O or NH, and R^9 to R^{13} , which may be the same or different, are independently selected from the group consisting of H, alkyl, aryl, alkenyl, alkoxy, amino, N-alkylamide, N-arylamide, hydroxy, halogen atom, acyl, acyloxy, acylamide, acyl-N-alkylamide, carboxyl, alkoxy carbonyl, or sulfonyl; wherein at least one of R^1 to R^8 and R^9 to R^{13} is sulfonyl group; and wherein formula is [II]:

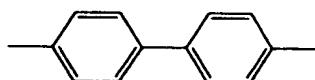


5 wherein R⁴⁷ to R⁵², which may be the same or different, are independently selected from the group consisting of H, alkyl, aryl, alkenyl, alkoxy, amino, N-alkylamide, N-arylamide, hydroxy, halogen atom, acyl, acyloxy, acylamide, acyl-N-alkylamide, carboxyl, alkoxycarbonyl, or sulfonyl; and at least one of R⁴⁷ to R⁵² is of sulfonyl; and

10 Formula J in formula [II] is selected from formula [II-a] or formula [II-b] and binds two anthraquinone,

Wherein the formula [II-a] is:

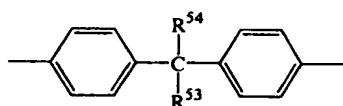
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and wherein the formula [II-b] is:

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wherein R⁵³ to R⁵⁴, which may be the same or different, are independently selected from the group consisting of alkyl(having 1 to 8 carbon atoms) or hydrogen ; and wherein (F)^{h+} represents ammonium ion or a cation derived from an organic amino compounds or a basic dye wherein h is 1 or 2, m⁴ is an integer from 1 to 4

45 and K⁴ is the ratio of m⁴/h.

13 .The composition of Claim 12, where in the laser-transmitting black colorant suitable for being mixed with a thermoplastic resin comprising at least amine salt of anthraquinone dyes of formula [I] where as at least one of R⁹, R¹⁰, R¹¹, R¹² and
5 R¹³ of formula [I-a] is sulfonyl group.

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